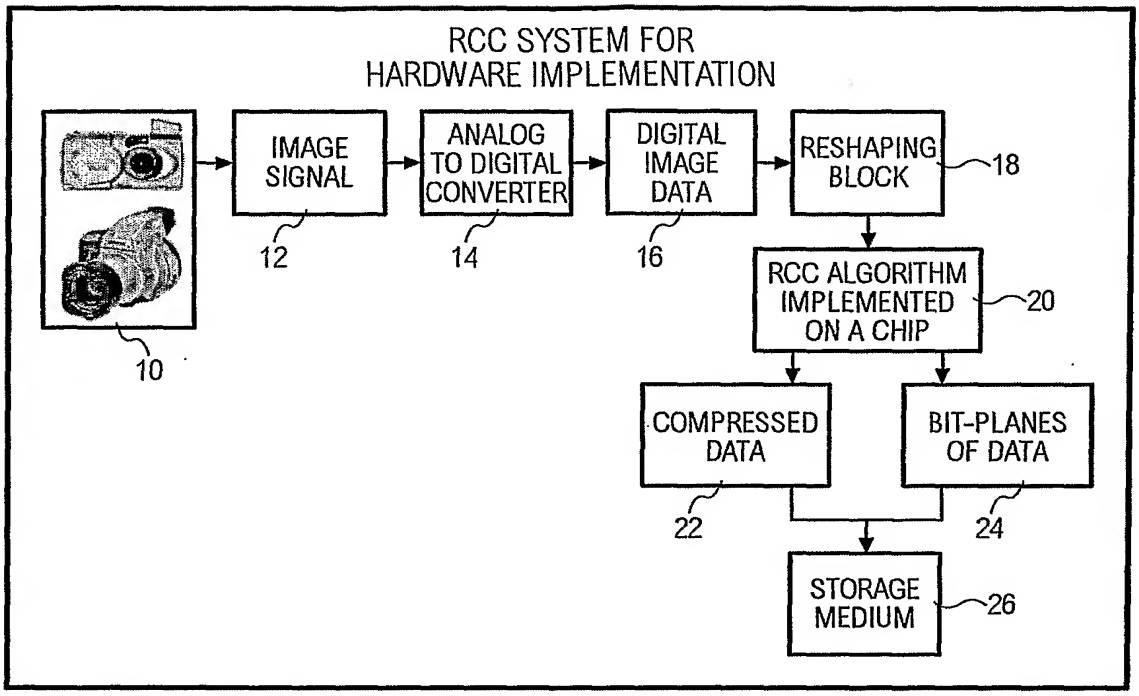

RCC SYSTEM FOR
HARDWARE IMPLEMENTATION
IMAGE SIGNAL
ANALOG TO DIGITAL CONVERTER
DIGITAL IMAGE DATA
RESHAPING BLOCK
18
12
14
16
RCC ALGORITHM IMPLEMENTED ON A CHIP
20
10
COMPRESSED DATA
BIT-PLANES OF DATA
22
24
STORAGE MEDIUM
26

FIG. 1

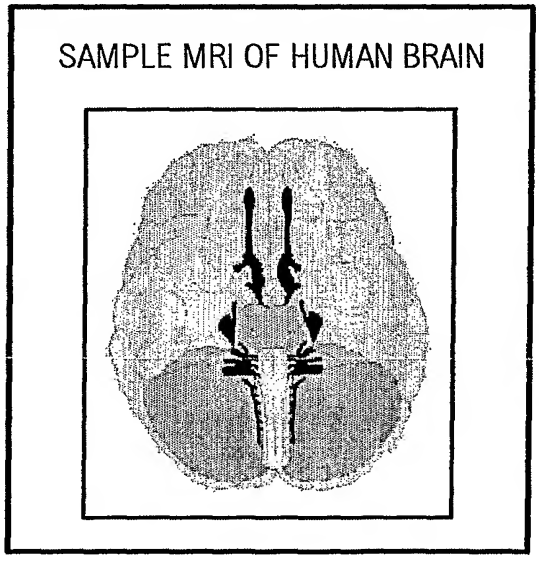

SAMPLE MRI OF HUMAN BRAIN

FIG. 2

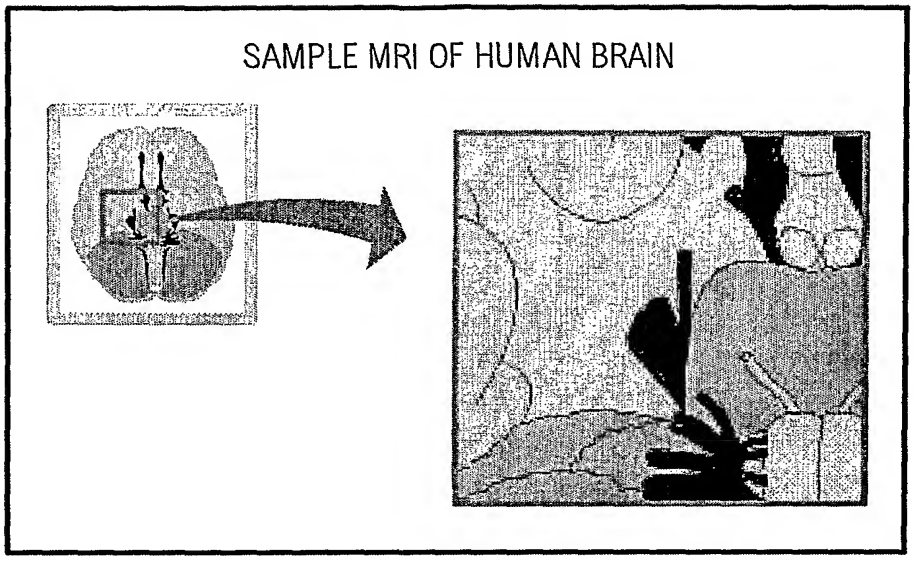

SAMPLE MRI OF HUMAN BRAIN

FIG. 3

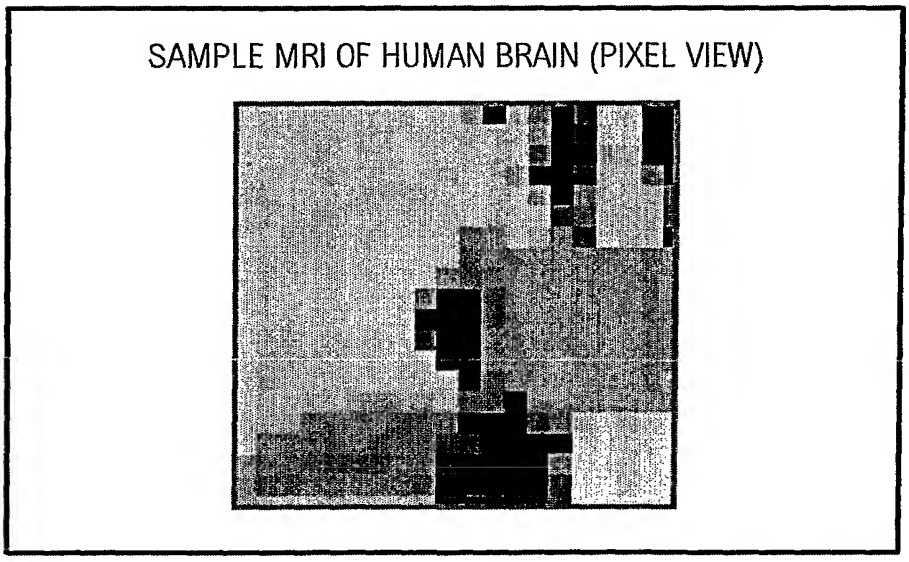

SAMPLE MRI OF HUMAN BRAIN (PIXEL VIEW)

FIG. 4

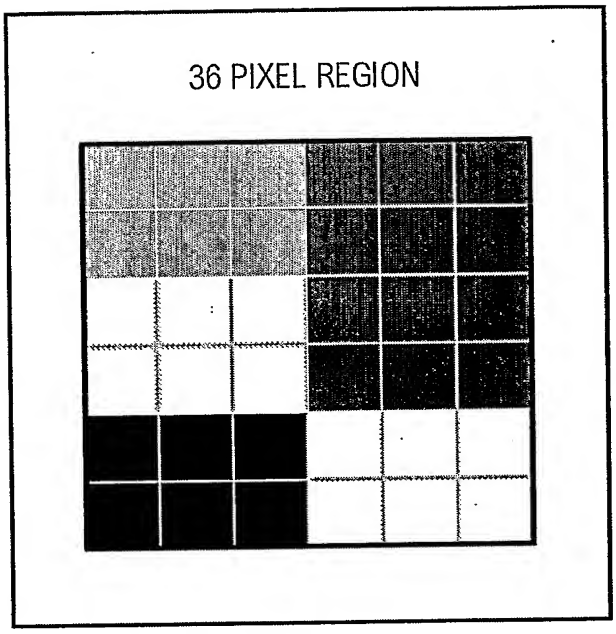

36 PIXEL REGION

FIG. 5

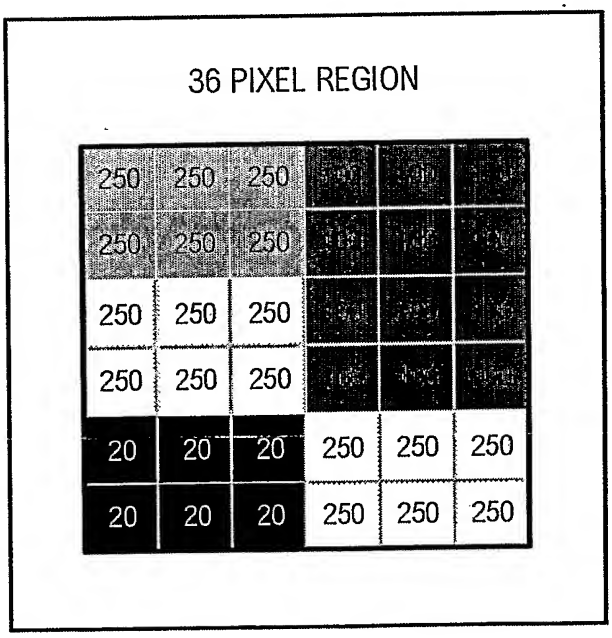

36 PIXEL REGION
250 250 250
250 250 250
250 250 250
250 250 250
20 20 20 250 250 250
20 20 20 250 250 250

FIG. 6

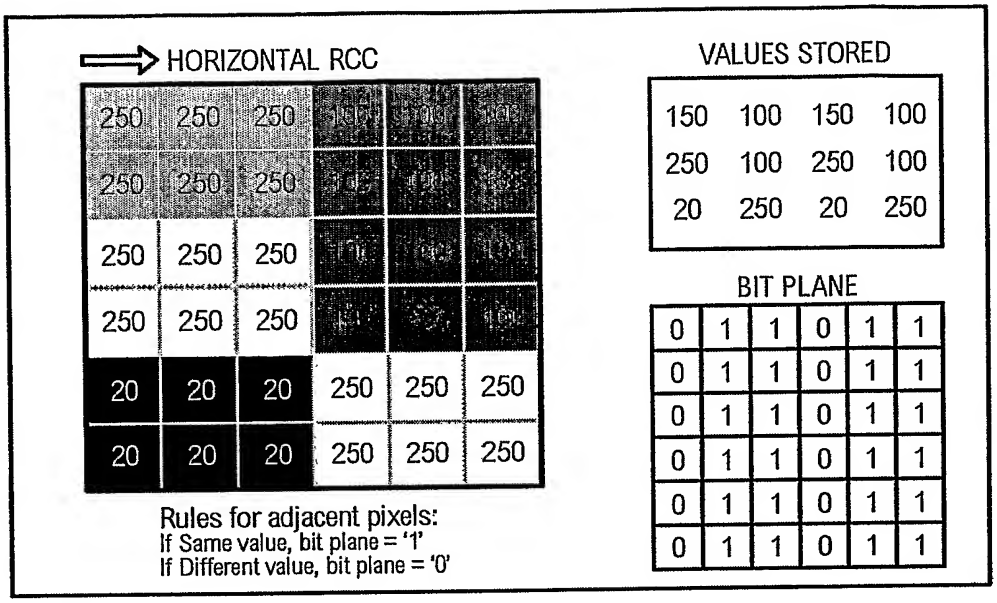

HORIZONTAL RCC
250 250 250 150 100 150
250 250 250 250 100 250
250 250 250 20 250 20
250 250 250 250 100 250
20 20 20 250 250 250
20 20 20 250 250 250
Rules for adjacent pixels:
If Same value, bit plane = '1'
If Different value, bit plane = '0'
VALUES STORED
150 100 150 100
250 100 250 100
20 250 20 250
BIT PLANE
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1

FIG. 7

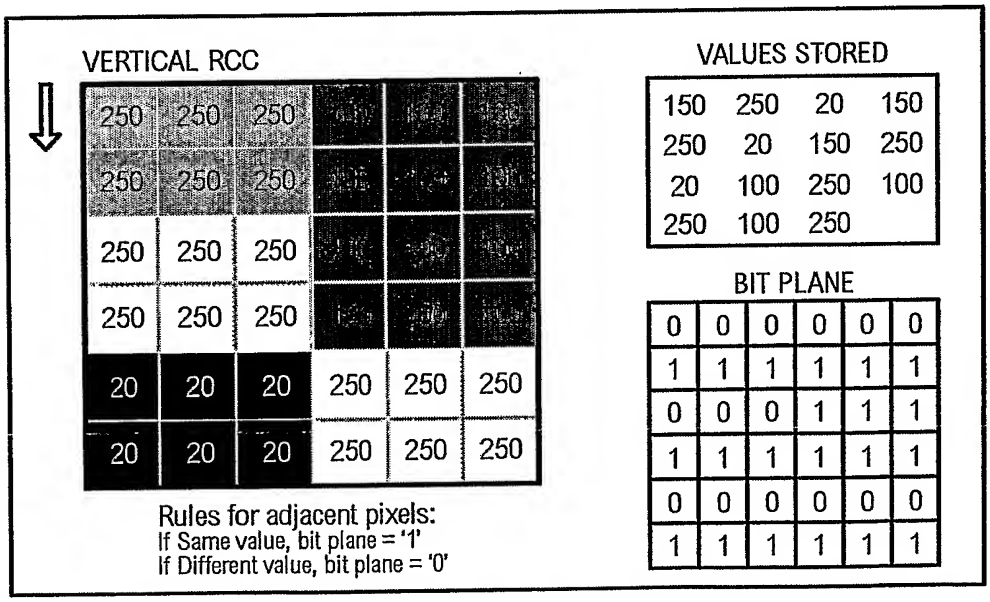

VERTICAL RCC
250 250 250 150 250 20
250 250 250 250 20 150
250 250 250 20 100 250
250 250 250 250 100 250
20 20 20 250 250 250
20 20 20 250 250 250
Rules for adjacent pixels:
If Same value, bit plane = '1'
If Different value, bit plane = '0'
VALUES STORED
150 250 20 150
250 20 150 250
20 100 250 100
250 100 250
BIT PLANE
0 0 0 0 0 0
1 1 1 1 1 1
0 0 0 1 1 1
1 1 1 1 1 1
0 0 0 0 0 0
1 1 1 1 1 1

FIG. 8

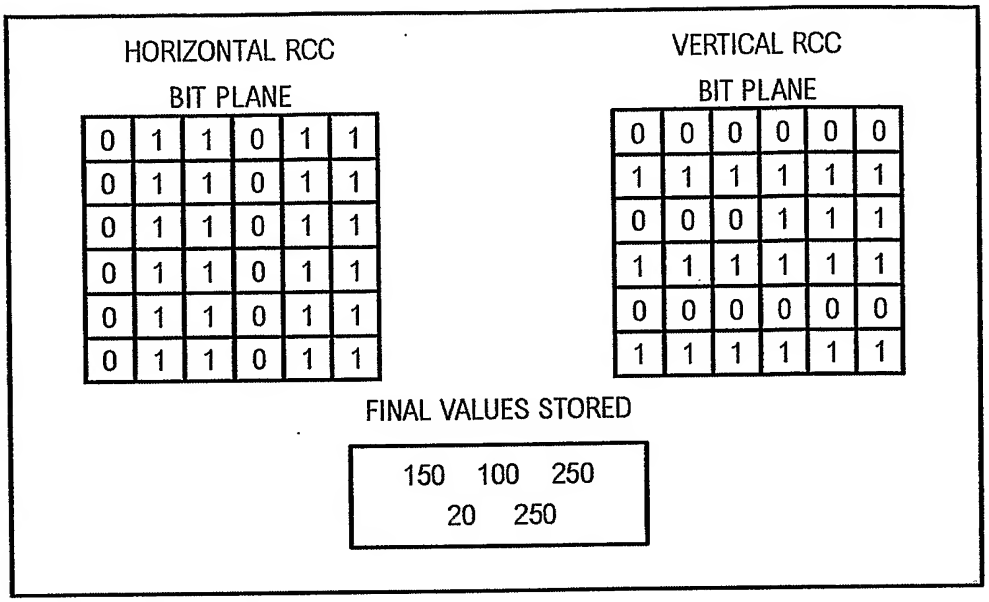

HORIZONTAL RCC
BIT PLANE
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1
0 1 1 0 1 1
VERTICAL RCC
BIT PLANE
0 0 0 0 0 0
1 1 1 1 1 1
0 0 0 1 1 1
1 1 1 1 1 1
0 0 0 0 0 0
1 1 1 1 1 1
FINAL VALUES STORED
150 100 250
20 250

FIG. 9

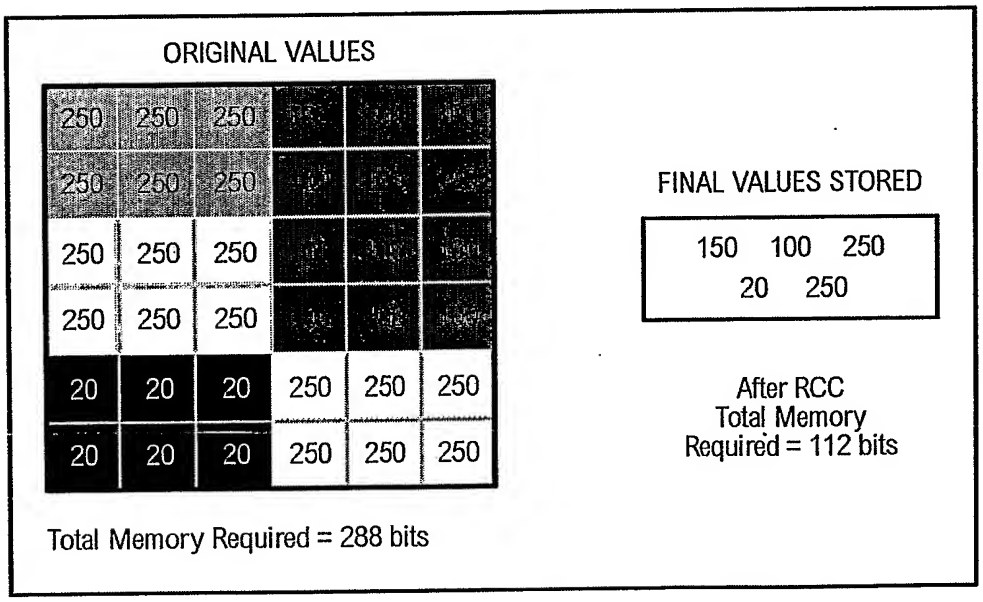

ORIGINAL VALUES
250 250 250
250 250 250
250 250 250
250 250 250
20 20 20 250 250 250
20 20 20 250 250 250
Total Memory Required = 288 bits
FINAL VALUES STORED
150 100 250
20 250
After RCC
Total Memory
Required = 112 bits

FIG. 10

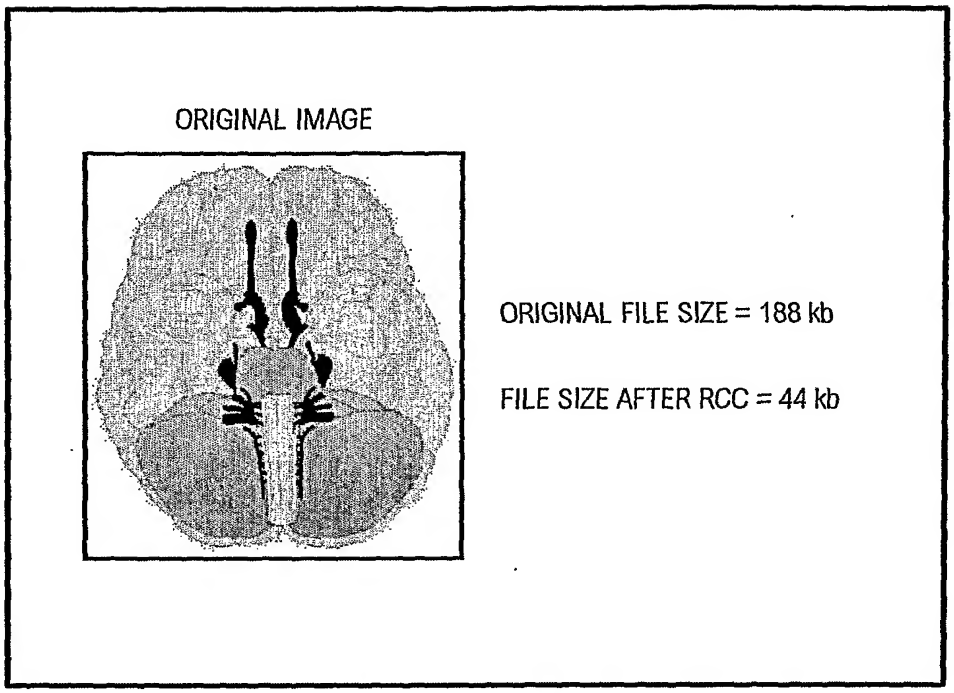

ORIGINAL IMAGE
ORIGINAL FILE SIZE = 188 kb
FILE SIZE AFTER RCC = 44 kb

FIG. 11

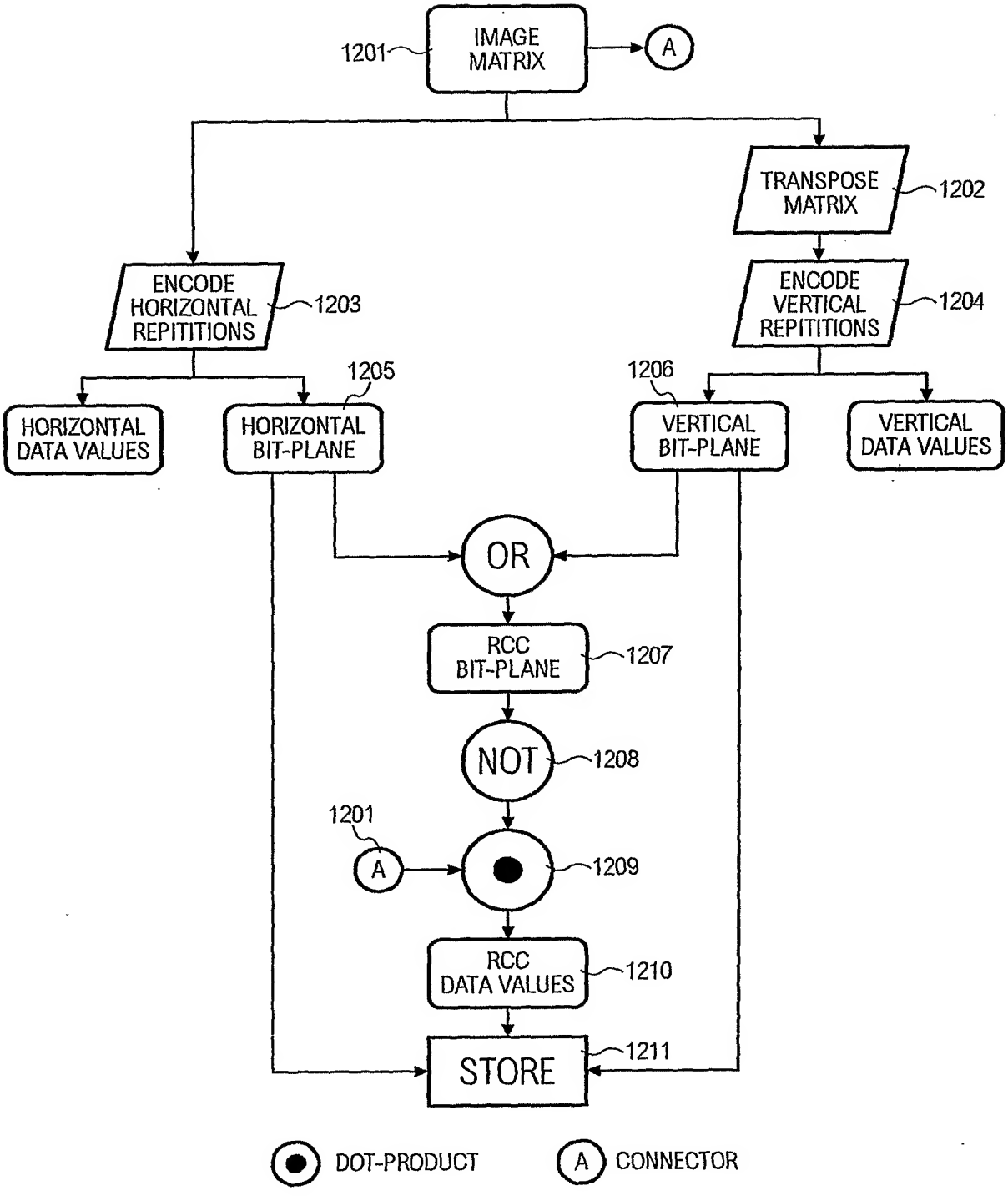

1201
IMAGE MATRIX
A
TRANSPOSE MATRIX
1202
ENCODE HORIZONTAL REPITITIONS
1203
ENCODE VERTICAL REPITITIONS
1204
1205
1206
HORIZONTAL DATA VALUES
HORIZONTAL BIT-PLANE
VERTICAL BIT-PLANE
VERTICAL DATA VALUES
OR
RCC BIT-PLANE
1207
NOT
1208
1201
A
1209
RCC DATA VALUES
1210
STORE
1211
DOT-PRODUCT
A
CONNECTOR

FIG. 12

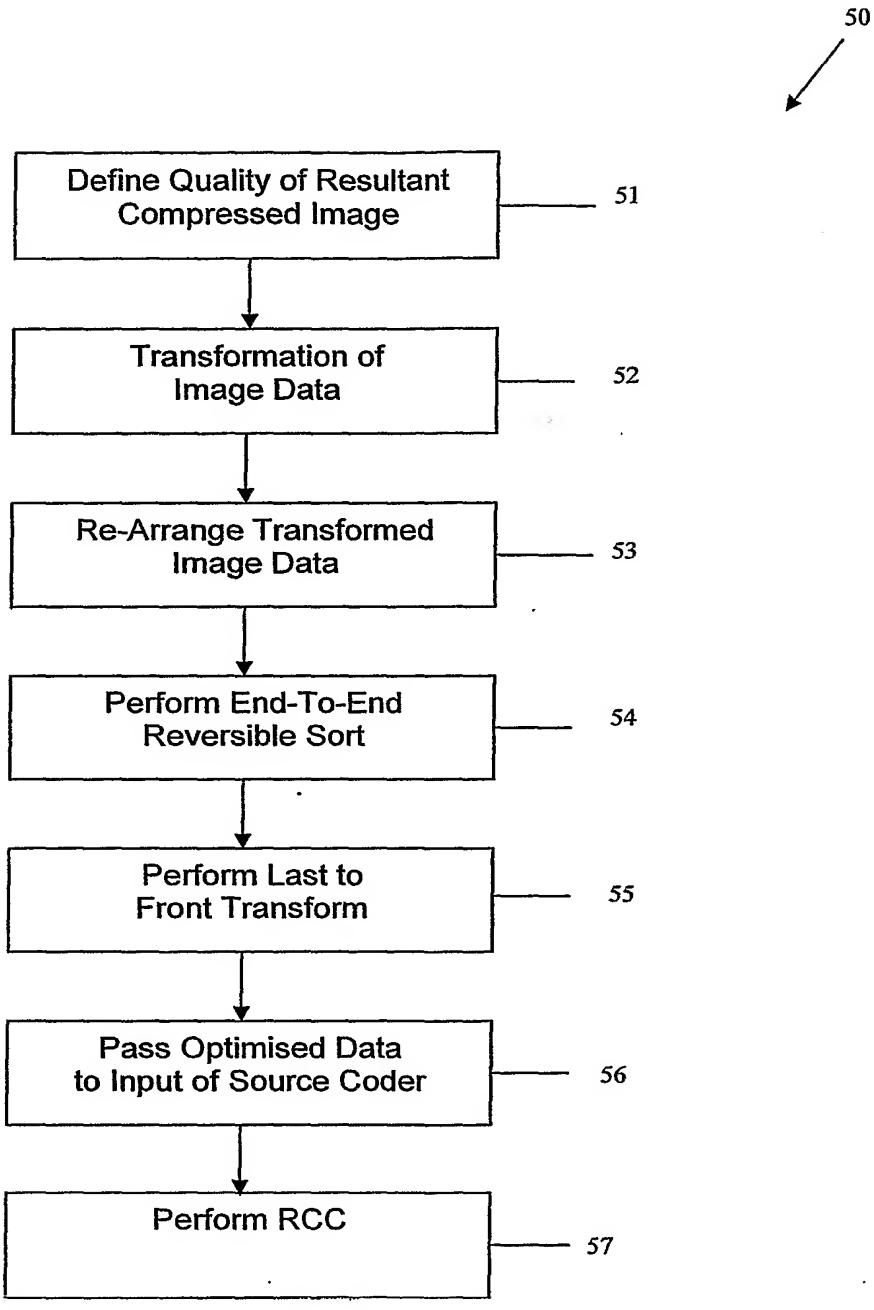

50
Define Quality of Resultant Compressed Image
51
Transformation of Image Data
52
Re-Arrange Transformed Image Data
53
Perform End-To-End Reversible Sort
54
Perform Last to Front Transform
55
Pass Optimised Data to Input of Source Coder
56
Perform RCC
57

Figure 13

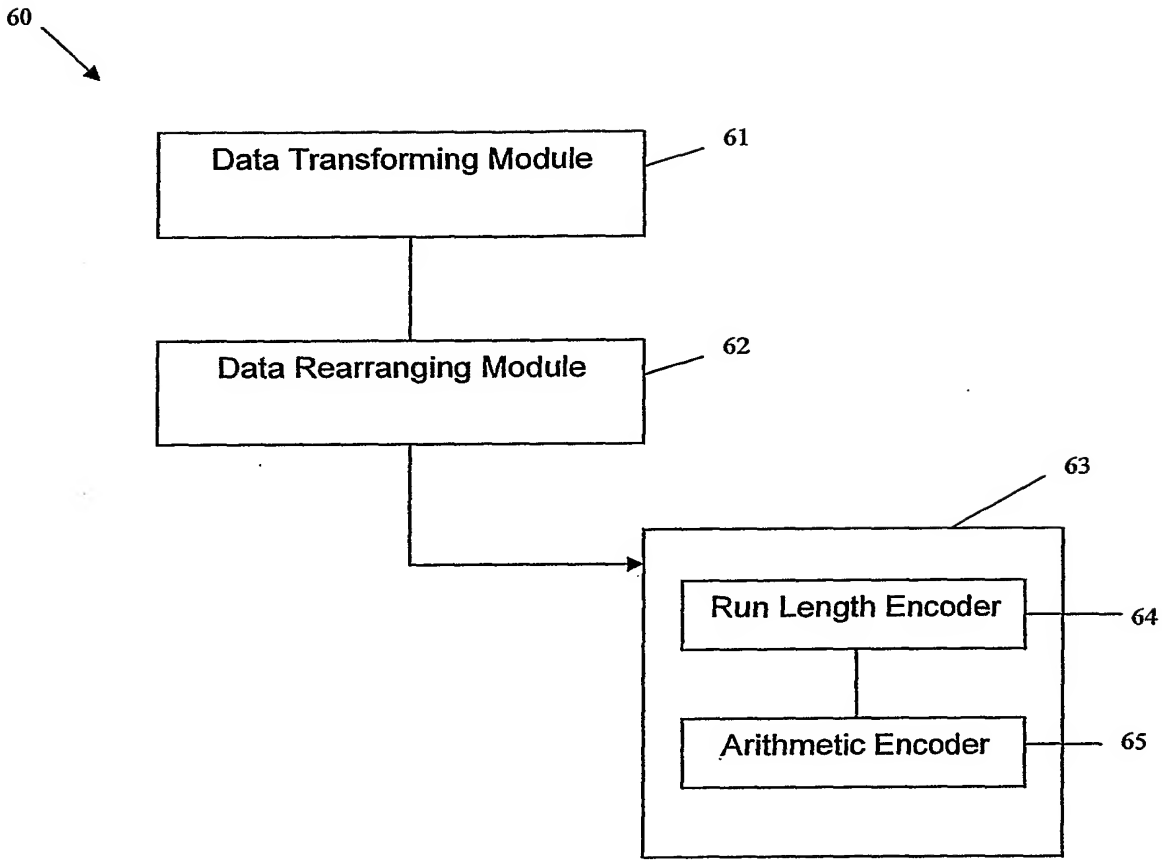

60
Data Transforming Module
61
Data Rearranging Module
62
63
Run Length Encoder
64
Arithmetic Encoder
65

Figure 14

FIGURE 15

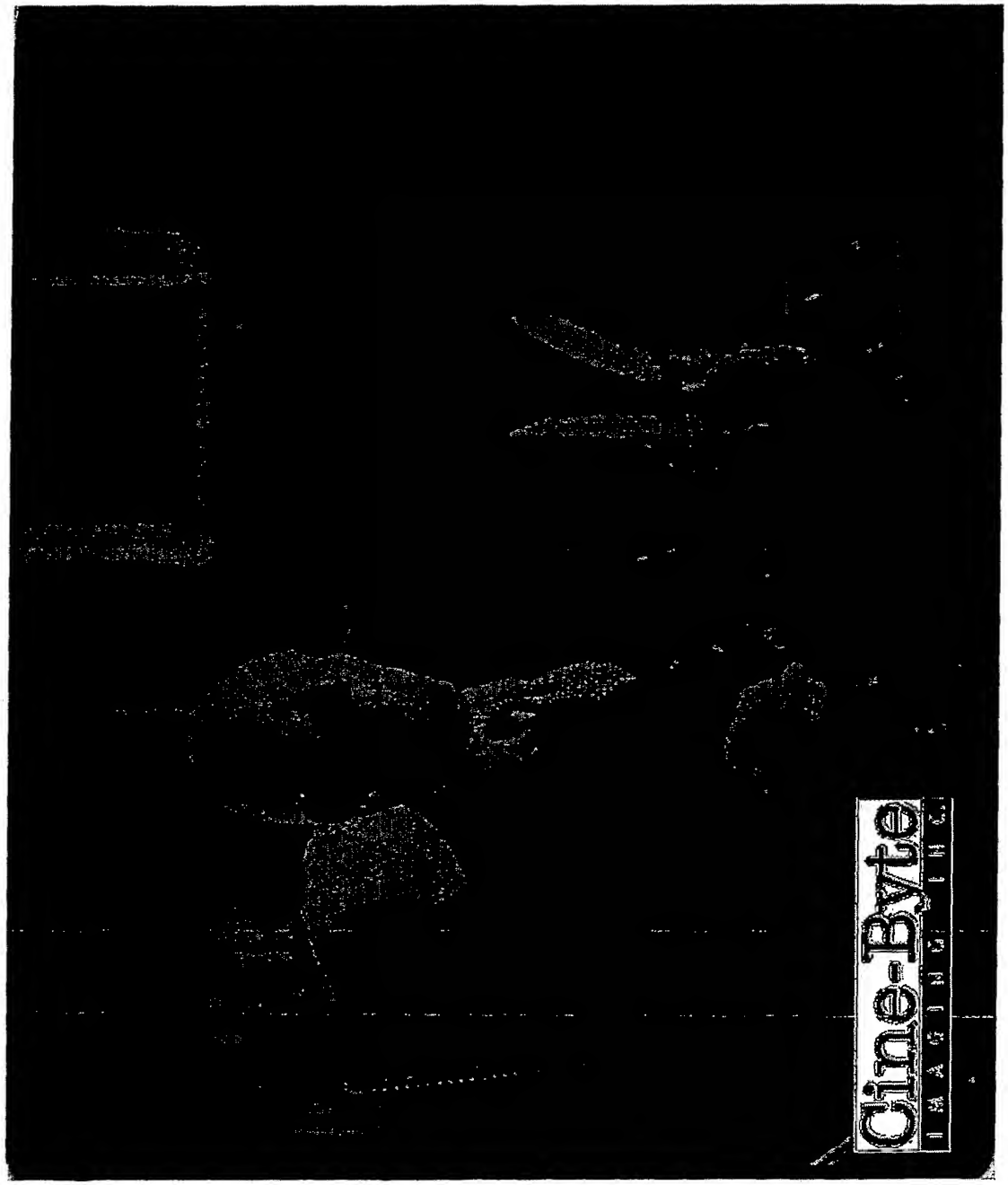


FIGURE 16

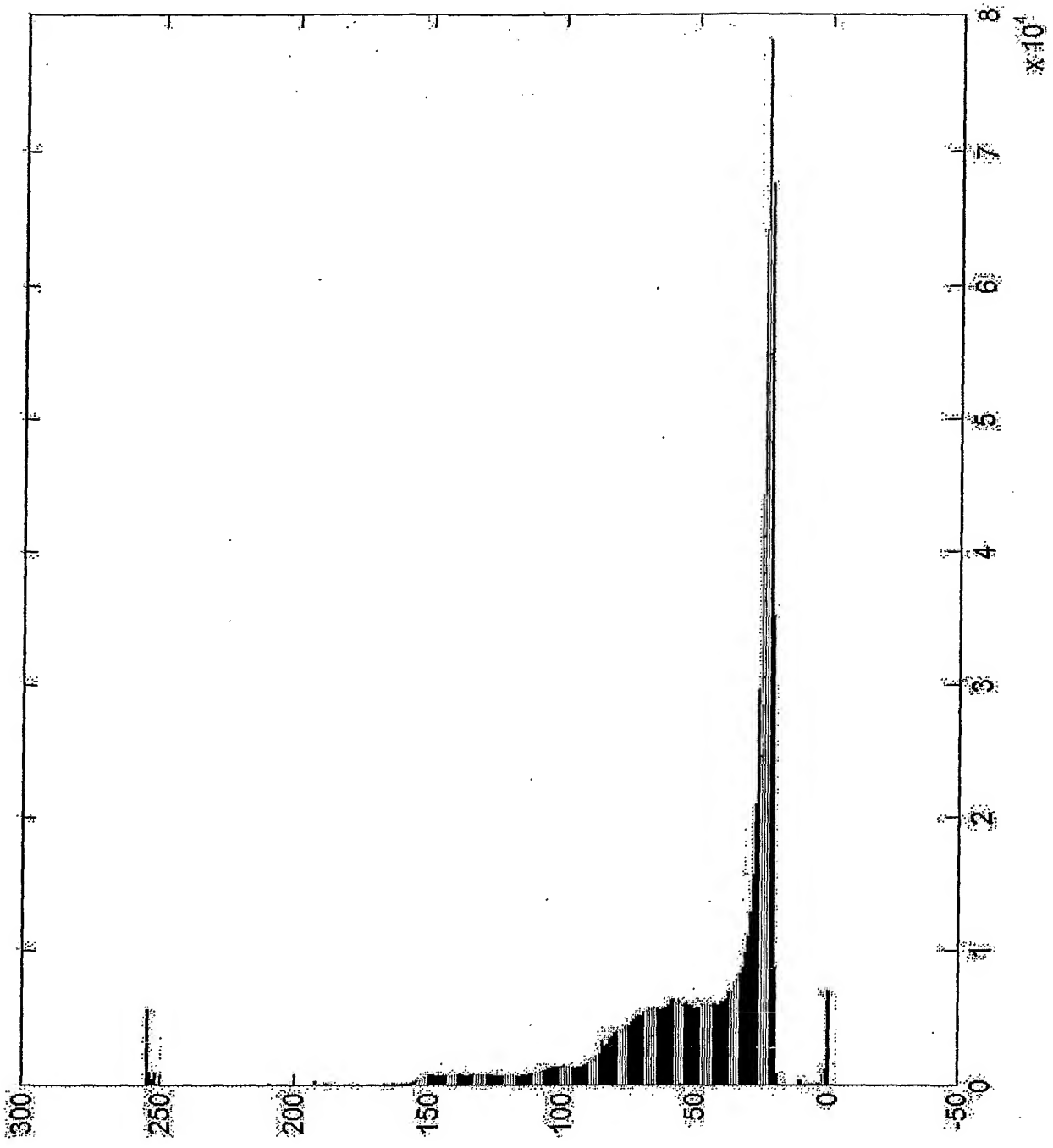


FIGURE 17

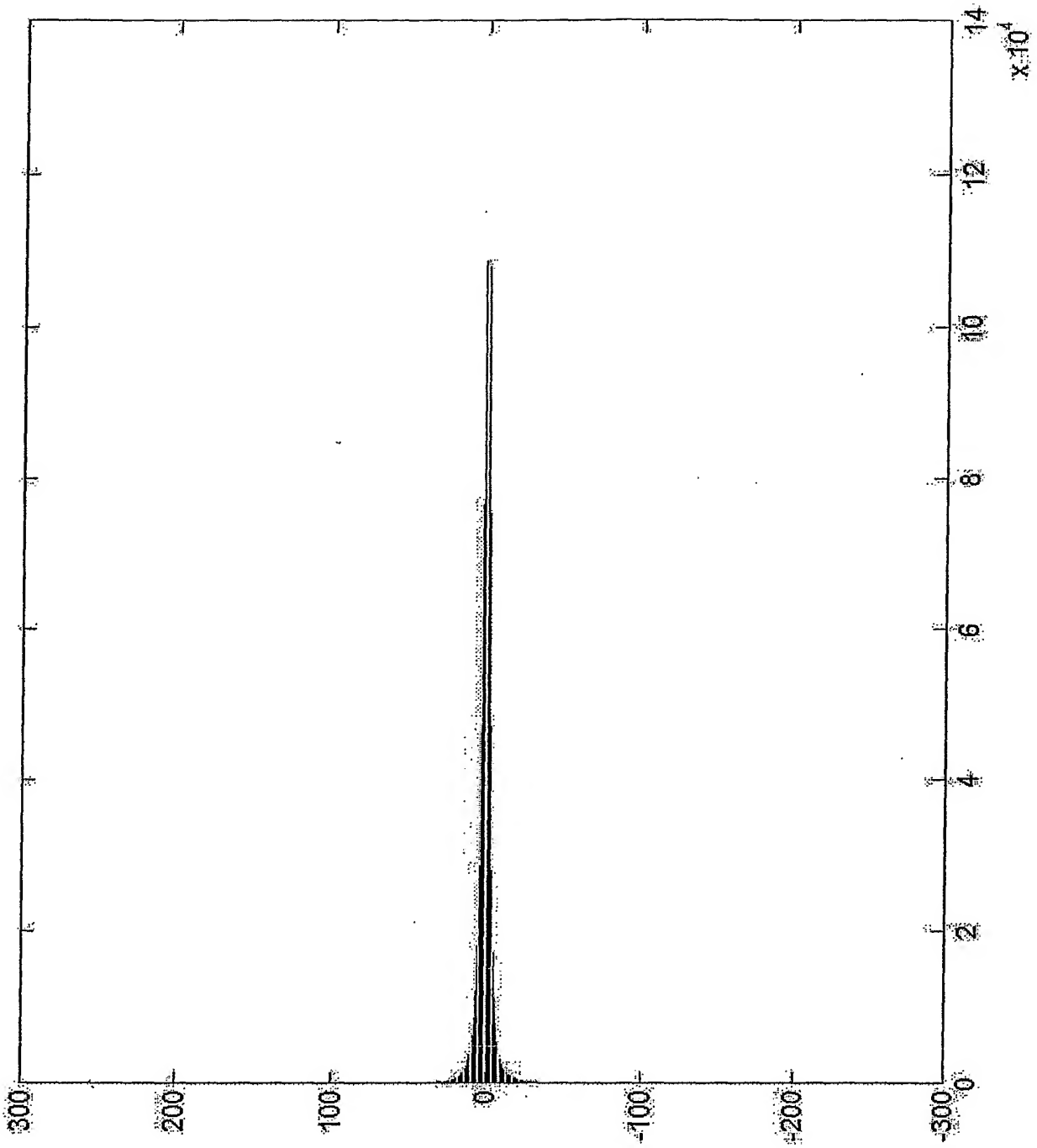


FIGURE 18

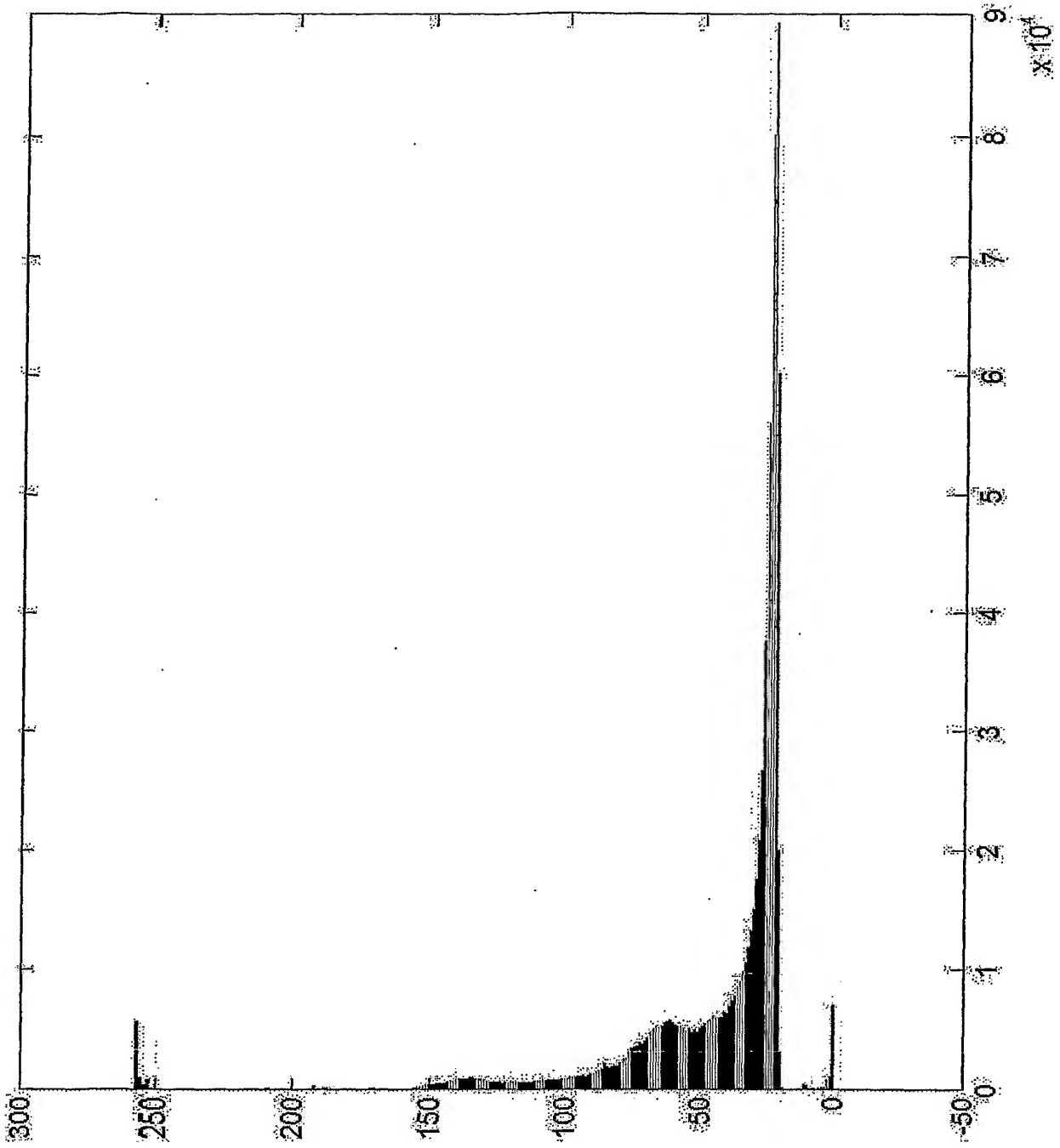


FIGURE 19

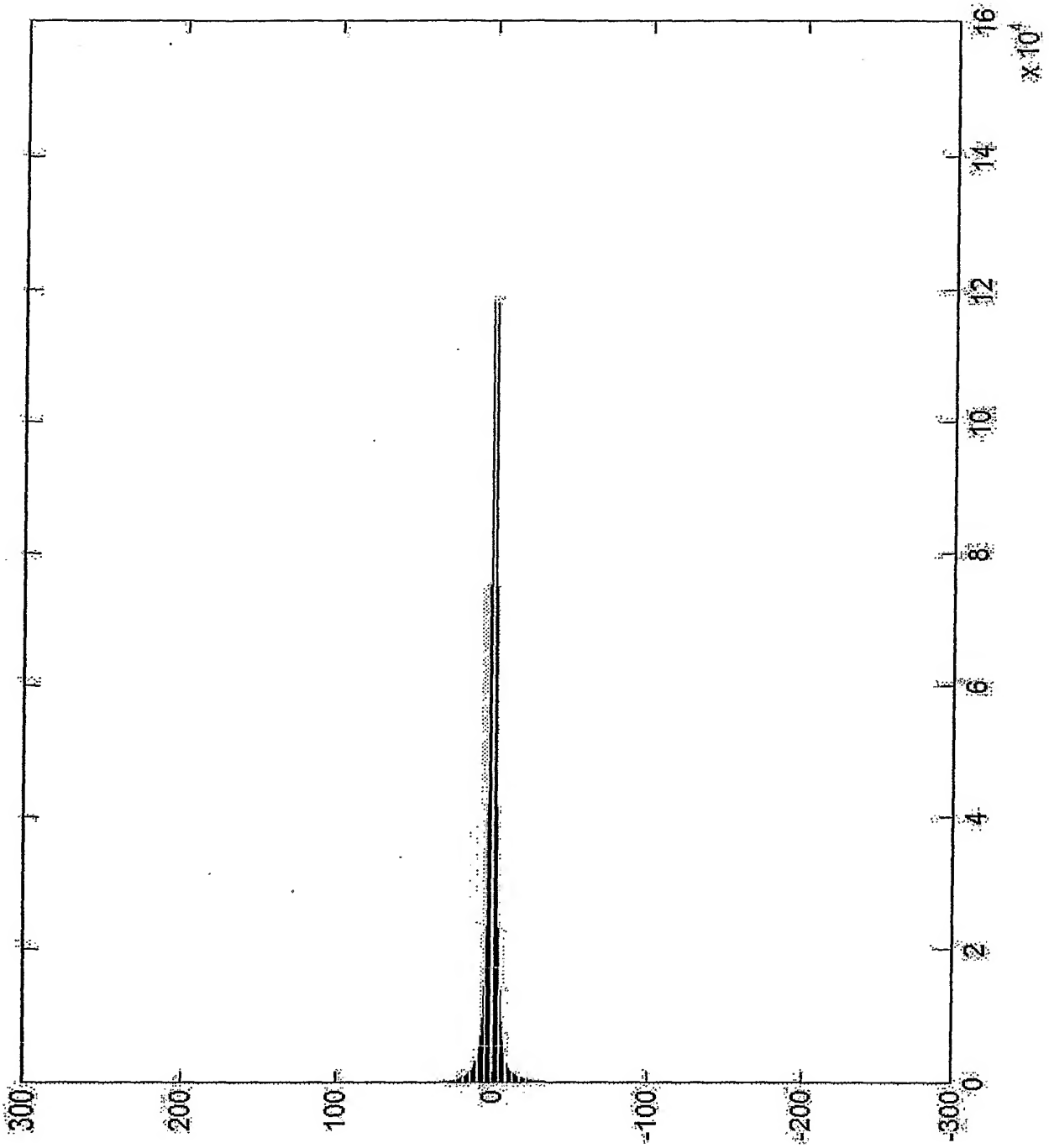


Figure 20

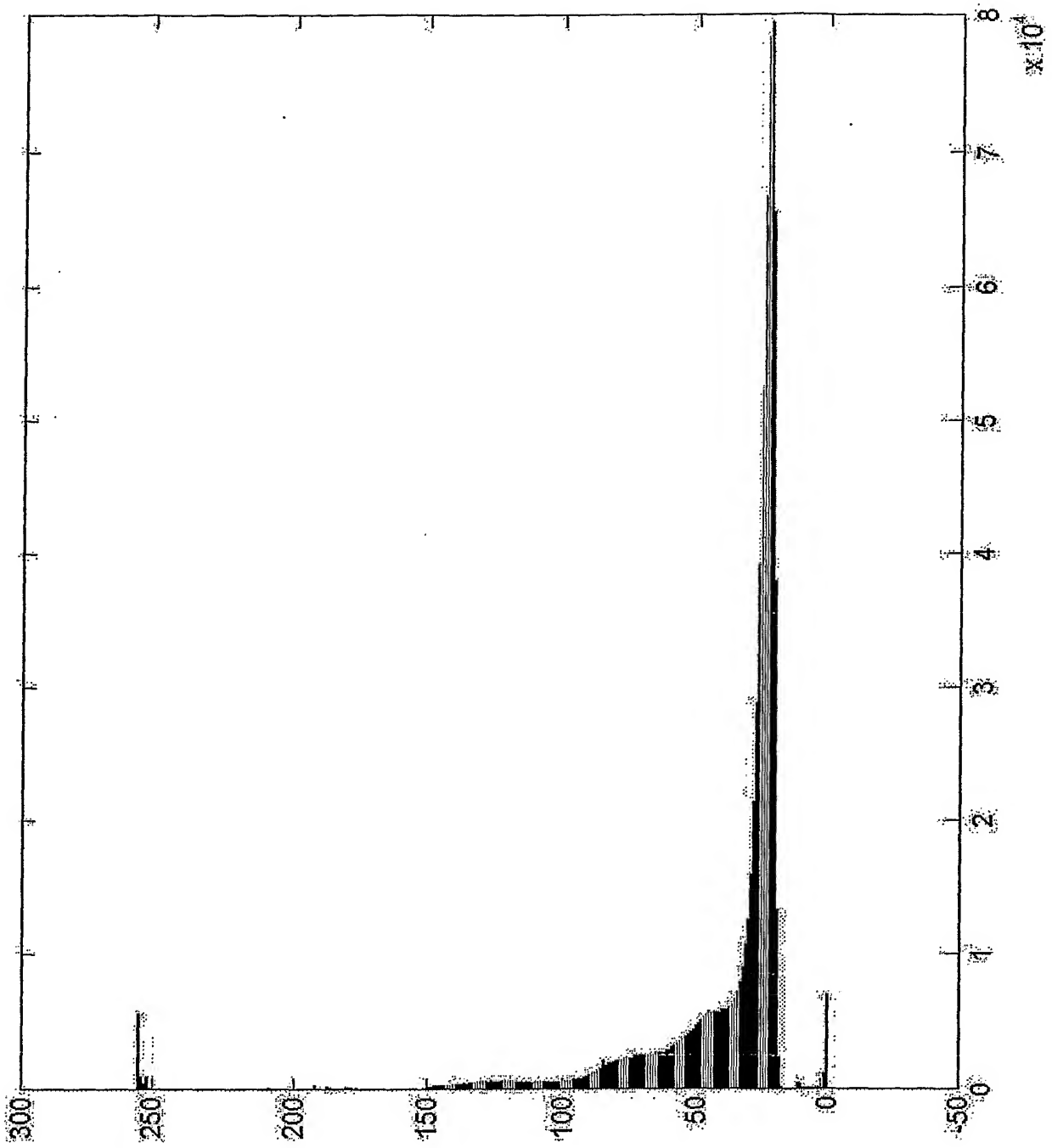


FIGURE 21

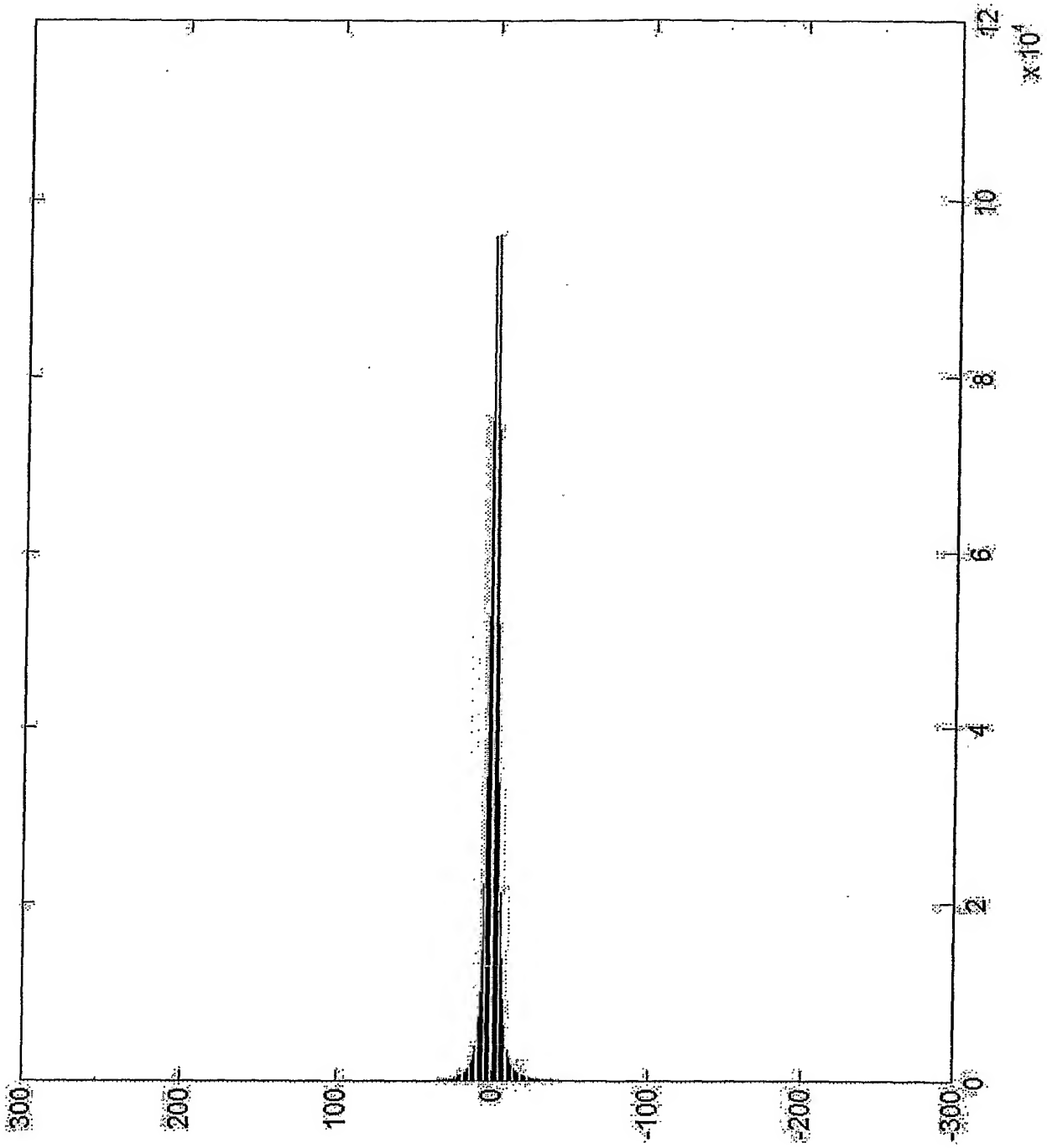


Figure 22

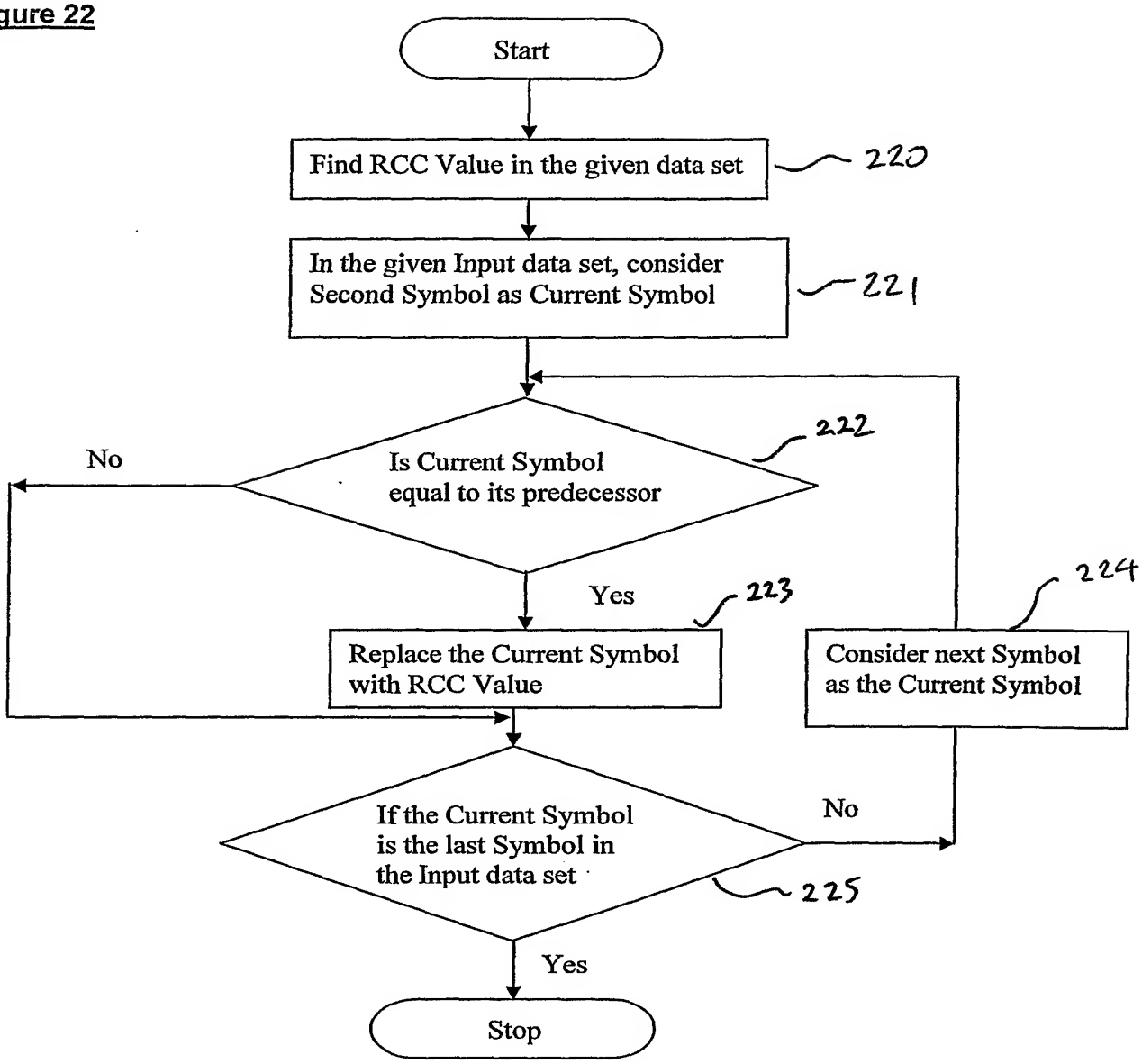

Start
Find RCC Value in the given data set
220
In the given Input data set, consider Second Symbol as Current Symbol
221
Is Current Symbol equal to its predecessor
222
No
Yes
223
Replace the Current Symbol with RCC Value
224
Consider next Symbol as the Current Symbol
If the Current Symbol is the last Symbol in the Input data set
225
No
Yes
Stop

Figure 23

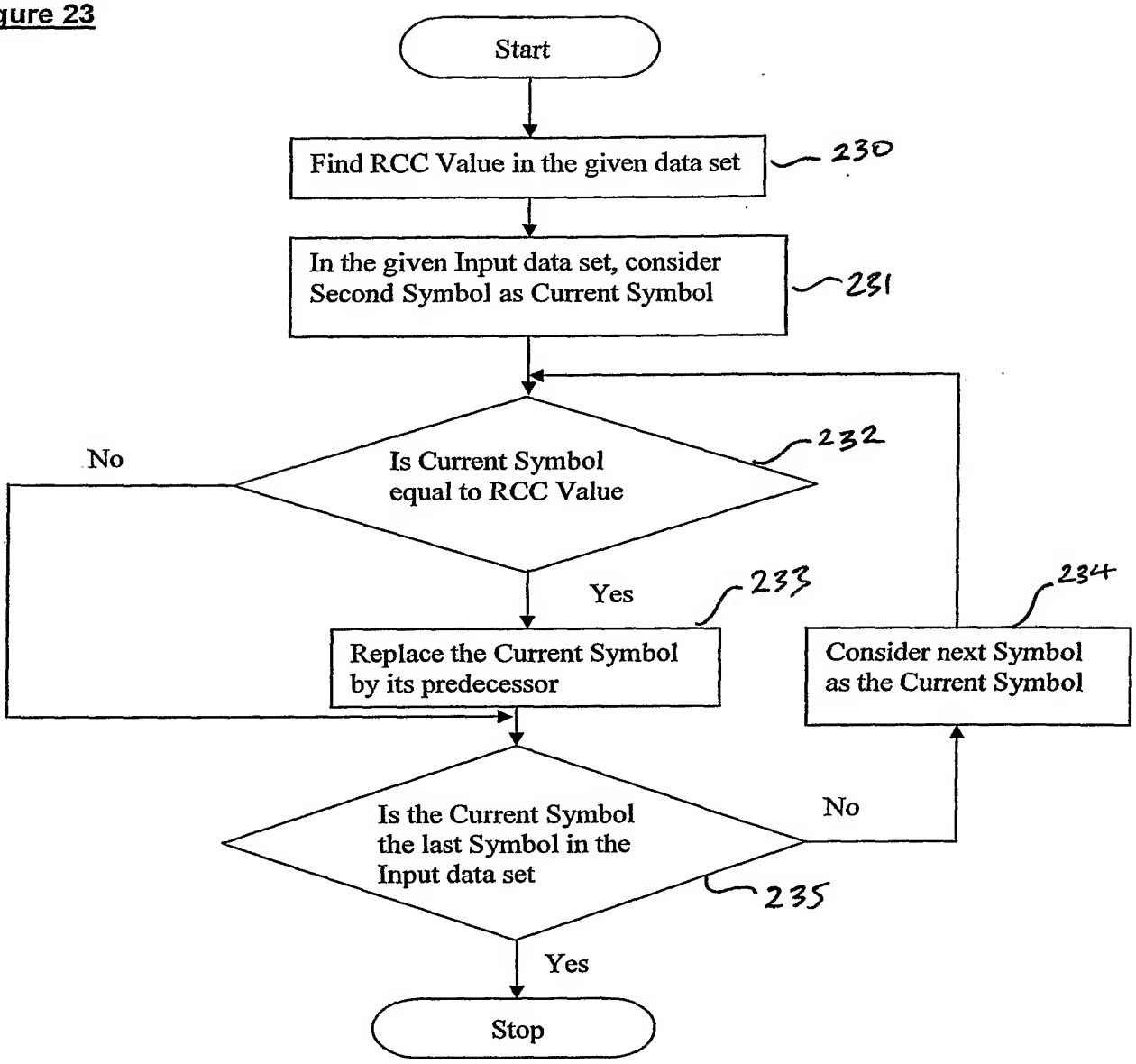
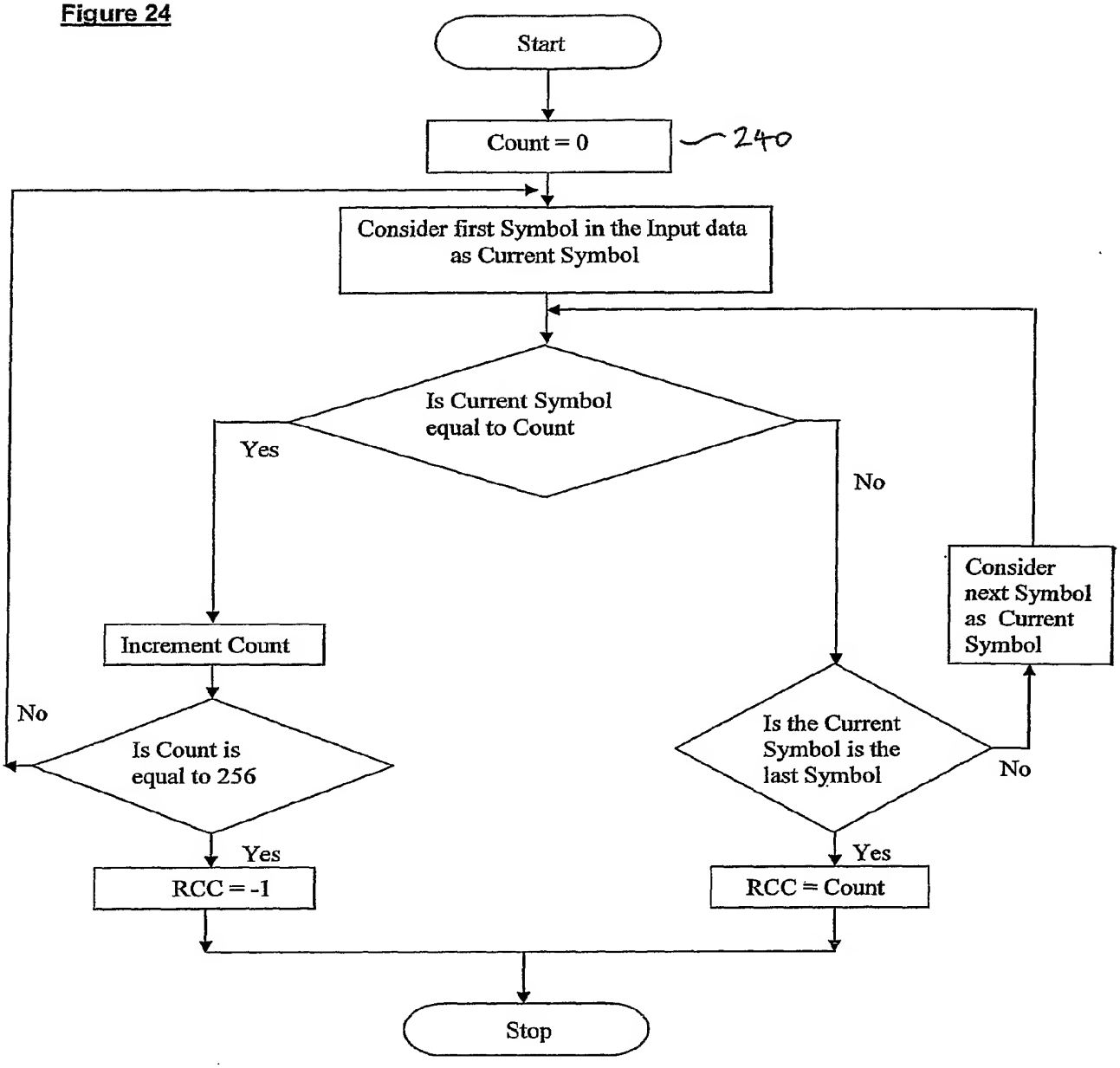

Start
Find RCC Value in the given data set
230
In the given Input data set, consider Second Symbol as Current Symbol
231
Is Current Symbol equal to RCC Value
232
No
Yes
Replace the Current Symbol by its predecessor
233
Consider next Symbol as the Current Symbol
234
Is the Current Symbol the last Symbol in the Input data set
235
No
Yes
Stop

Figure 24



Note: RCC value is equal to -1 indicates that no valid symbol can be identified as RCC value.

Figure 25

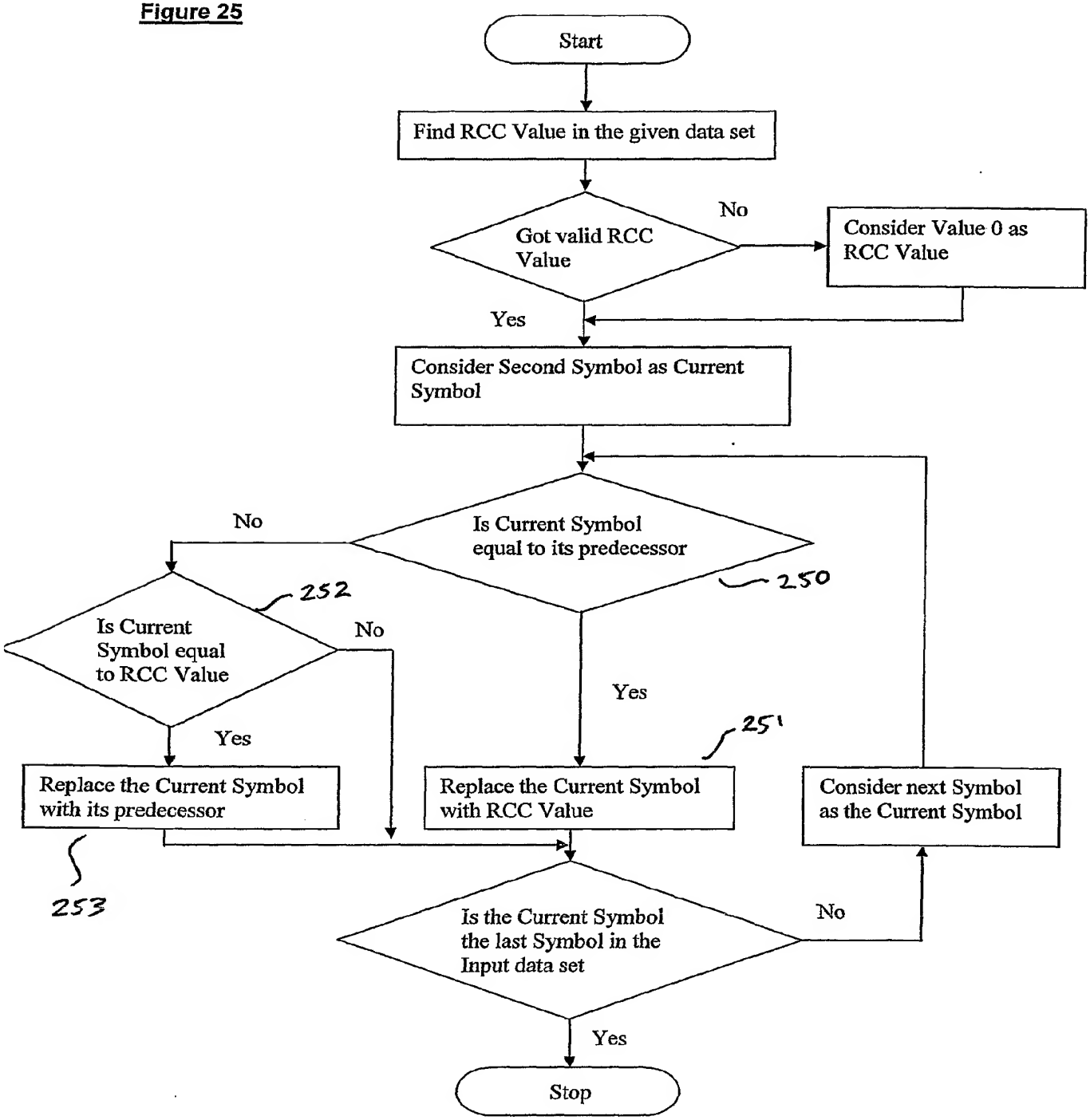

Start
Find RCC Value in the given data set
Got valid RCC Value
No
Consider Value 0 as RCC Value
Yes
Consider Second Symbol as Current Symbol
Is Current Symbol equal to its predecessor
250
No
Yes
Is Current Symbol equal to RCC Value
252
No
Yes
Replace the Current Symbol with its predecessor
253
Replace the Current Symbol with RCC Value
251
Consider next Symbol as the Current Symbol
Is the Current Symbol the last Symbol in the Input data set
No
Yes
Stop

Figure 26

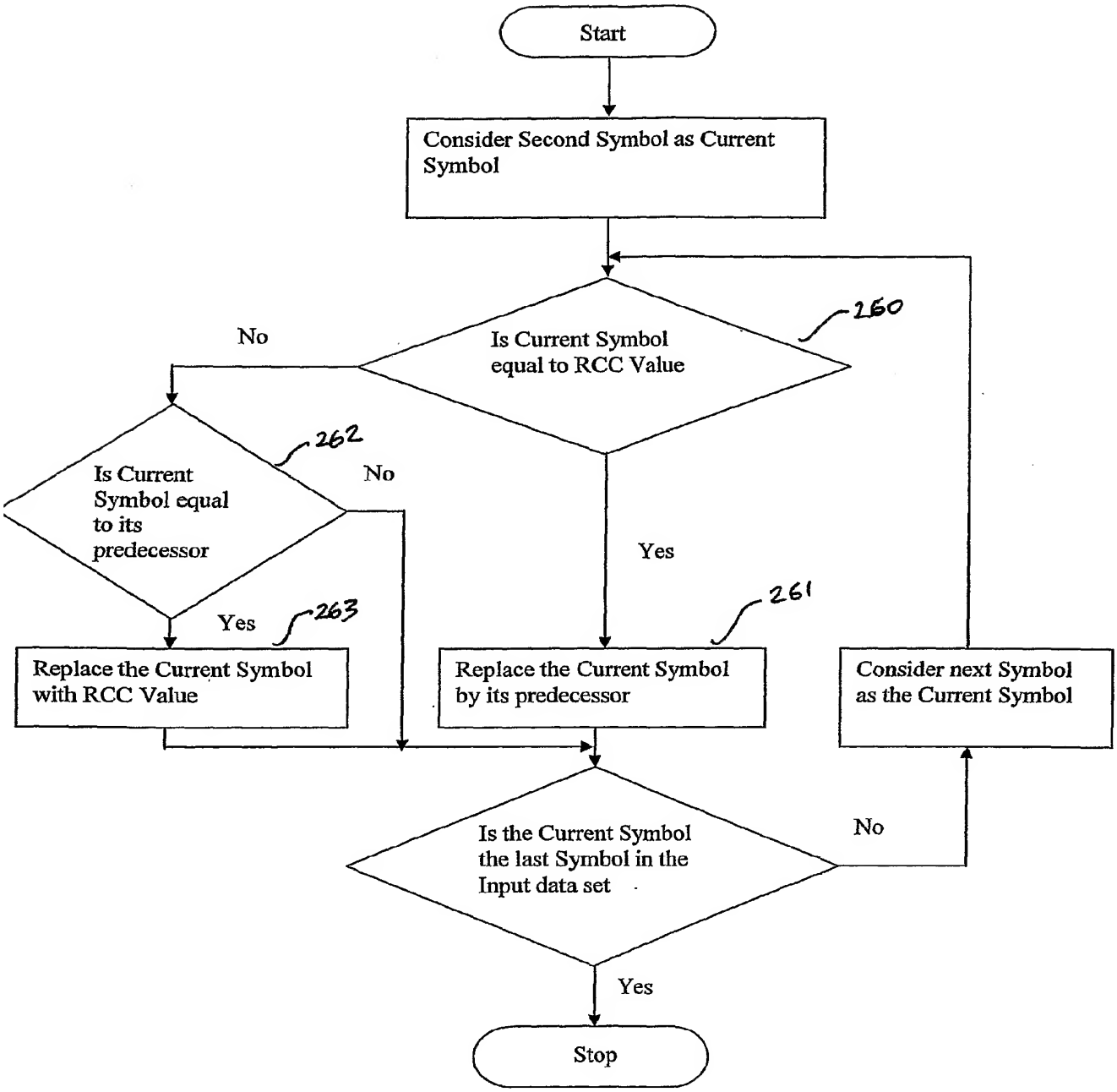
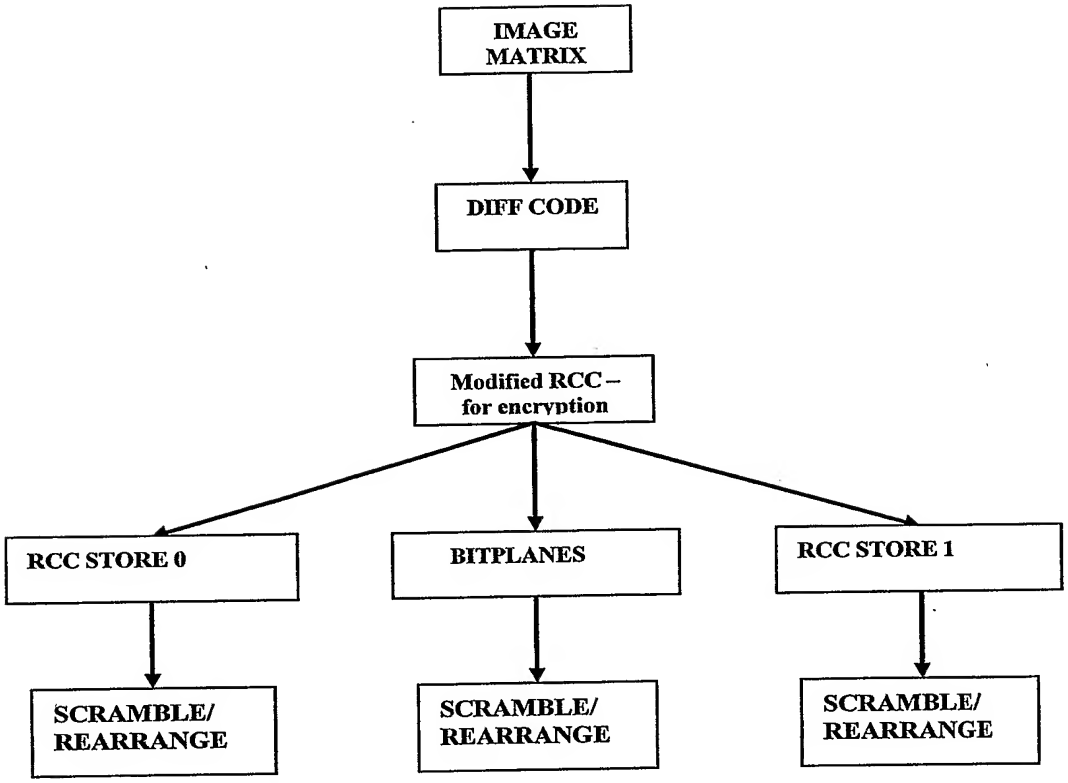
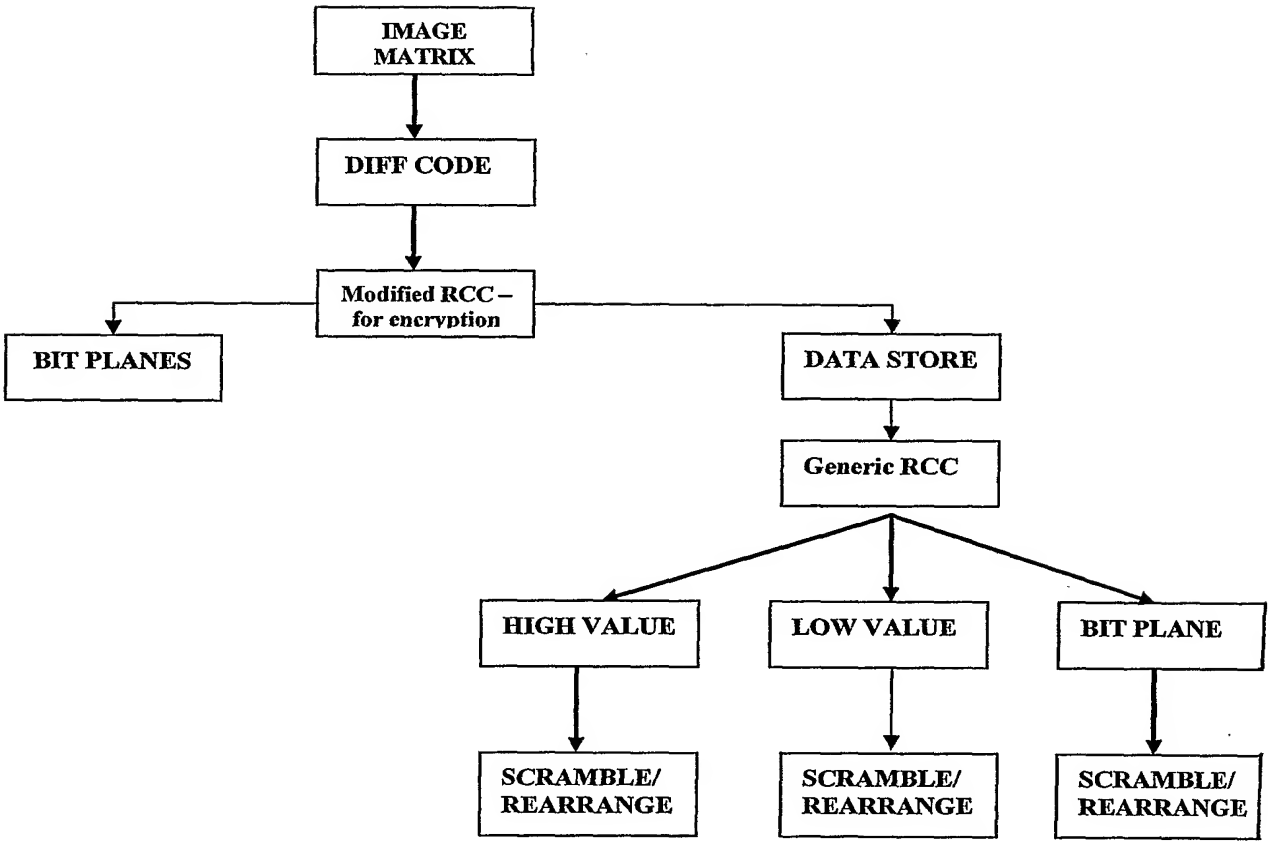

Start
Consider Second Symbol as Current Symbol
Is Current Symbol equal to RCC Value
260
No
Yes
Is Current Symbol equal to its predecessor
262
No
Yes
263
Replace the Current Symbol with RCC Value
Replace the Current Symbol by its predecessor
261
Consider next Symbol as the Current Symbol
Is the Current Symbol the last Symbol in the Input data set
No
Yes
Stop

Figure 27



Flow Diagram for RCC and Encryption Method 1

Figure 28



Flow Diagram for RCC and Encryption Method 2